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THE JOURNAL OF PHYSIOLOGY

Journal of Physiology. Edited, with the co-operation in England of Prof. A. Gamgee, F.R.S., of Manchester, Prof. W. Rutherford, F.R.S., of Edinburgh, Prof. J. Burdon-Sanderson, F.R.S., of London; and in America of Prof. H. P. Bowditch, of Boston, Prof. H. M. Martin, of Baltimore, and Prof. H. C. Wood, of Philadelphia, by Michael Foster, M.D., F.R.S. (London: Macmillan and Co.)

THERE is perhaps no science which is making more rapid advances than that of physiology, and which is at the same time so interesting to general readers, as well as to those engaged in its special prosecution. A knowledge of the processes of life has such a close relation to individual health and happiness that it ought to be more or less taught to every child at school, and all thinking men must note its advances with interest. So swift is the progress of physiological science, that it has necessitated for this journal a mode of publication, now becoming common in Germany, but of which this is perhaps the first example in this country. Instead of appearing at regular intervals, the *Journal of Physiology* is published in numbers, which are issued at periods varying from two to three months, according to the supply of material sent in to the editors. From four to six numbers will form a volume of about 500 pages. The advantage of this mode of publication is that it prevents a discovery made by one man from being forestalled by another whose observations, although really made later in point of time, might sometimes obtain priority under the ordinary method of publication.

The title-page of the *Journal* shows that it is to some extent an international work, three American co-operating with three English professors, under the able editorship of Dr. Michael Foster. The first numbers contain contributions from the Continent of Europe as well as from Great Britain and America, one of the most interesting articles in them being contributed by a German, Prof. Kühne, of Heidelberg. The range of subjects is very wide, and includes papers on almost every function of the body—innervation, motion, circulation, respiration, and secretion. Some time ago an account was given in NATURE of Kühne's interesting discoveries regarding visual purple, that pigment in the eye which is so susceptible to the action of light. In his present paper he takes up the other pigments of the retina, which are either not affected at all, or only to a slight extent, by exposure to light. He has succeeded in discovering and isolating from a bird's retina no less than three distinct pigments of great stability, and he gives in one paper the mode of preparation, properties, and spectroscopic appearances of these substances. In the same paper he simply mentions the black pigment of the retina, which he regards as exceedingly stable, and little altered by light; but while the number of the *Journal* in which his paper is contained was still passing through the press he made the discovery that this pigment does not resist the action of light so perfectly as he at first supposed, and is slowly altered by exposure. This leads him to remark that "if one considers the extremely widespread occurrence in the animal kingdom of the black pigment of the eye and other similarly stable pigments, it is scarcely possible to repress the idea that these, in addition to visual purple, also represent visual excitants, or so-called visual substances, and are intended to be decomposed by light during life, and to yield those substances which stimulate chemically the terminal apparatus of the visual organ." He also calls attention to the remarkable circumstance that the pigments of a bird's retina he has discovered are so mixed with oil globules that the colours in the cones of the retina represent exactly half the spectral colours, viz., from red to yellowish green, so that with their complementary colours they yield all the colours of the spectrum. He also observed that the three pigments are most readily decomposed by blue light, less by green, and not at all by red. Comment is unnecessary on the importance of this paper in reference to vision.

In a preliminary note Mr. Gaskell contributes some interesting observations on the vaso-motor nerves of striated muscles. He had previously found that irritation of the motor nerve of a muscle dilated its vessels, and increased the flow of blood through it, at the same time that contraction was produced so that fresh supplies of nutriment and oxygen were supplied to the muscle by the blood at the same moment that it was stimulated to work. He has now shown that the same phenomena may be produced reflexly by irritating a sensory nerve, and that the dilatation of the vessels will occur, and the blood will flow more freely through the muscle even when it is prevented from moving by paralysing the motor nerves with curare. On then irritating a sensory nerve, the current of blood is increased as usual in the paralysed muscle, which would have contracted under ordinary circumstances, and thus proof is afforded that the vaso-dilating nerves are distinct from the motor nerves of the muscle.

Mr. Priestley gives a full account of the literature regarding the pulsations of the lymph-hearts in the frog, and he details a number of experiments which demonstrate several new facts, as well as confirm the observations of other physiologists.

In a joint paper, Dr. Gamgee and Mr. Priestley criticise Tarchanoff's statement that each vagus nerve can set in action the whole inhibitory apparatus contained in the heart, and that when this apparatus, whose function is to lessen or stop the cardiac beats, has been exhausted by irritation of one vagus no stimulation of the other can stop the cardiac pulsations. Their own experiments show that even when one vagus has been exhausted, irritation of the other will still stop the heart, and even when both are exhausted the inhibitory apparatus is still active, so that the pulsations of the heart may even then be arrested by galvanism applied to the venous sinus. They therefore conclude that the inhibitory apparatus in the heart is much less easily exhausted by stimulation than the vagi, and that it may still retain its power over the heart although both vagi are so exhausted that they will no longer convey to it a stimulus applied to them.

The question as to whether the apex of the frog's heart contains within itself ganglia which will keep up its rhythmical motion has lately been the subject of lively debate, but Dr. Bowditch brings forward a number of

experiments which seem to point strongly towards a negative answer.

An interesting paper on the respiration of the frog is contributed by Prof. Martin, whose observations strongly suggest a close relationship between the nervous centre which regulates respiration and that which regulates general reflex action, even if the two should not be identical. He discusses the question whether there be two independent, though closely related, nervous centres, one for inspiration and the other for expiration, or whether, as supposed by Budge, there is a single centre from which the muscles of inspiration and those of expiration may receive their innervation according to circumstances. Dr. Martin shows that this latter hypothesis does not hold good for the frog, and that in it there are really two distinct centres, one for inspiration, and one for expiration, each having its own stimulus, and generating its own nervous impulse, which can travel in them only to its own set of muscles quite independently of the resistance opposed to discharge from the other centre.

Those who are interested in the electro-motive properties of muscle will find in this journal an admirable report on this subject by Prof. Burdon Sanderson, in which he gives an account of Hermann's recent work in this department of animal electricity, along with such information both regarding modes of investigation and experimental results as greatly facilitate comprehension of the subject.

A most laborious and fatiguing series of experiments has been made by Mr. North on the effects of starvation with and without severe labour, and on the elimination of urea from the body. These experiments were made upon himself, and, in addition to the personal discomfort produced by a complete abstinence from food, he voluntarily underwent severe exercise upon the treadmill, for the purpose of ascertaining exactly the effect of labour upon the excretion of urea. Flint had found that in the case of Weston, the pedestrian, the excretion of urea was considerably increased during a long walk, and Mr. North's observations go to show that severe exercise does increase the elimination of urea, but the increase is very small, both when the person is fed upon ordinary diet, and when nitrogenous food is entirely withheld. The quantity of urea passed, however, depends largely on the condition of the body at the time, varying according to the greater or smaller reserve of nitrogenous material contained in it, and he thinks that Weston, before entering upon his walk, had accumulated a large reserve, from which the urea he excreted was derived.

The paralysis produced by potash salts when injected into the circulation, is usually ascribed to a special action upon the muscles and heart. Dr. Ringer and Mr. Murrell, however, from a number of experiments on the subject, have come to the conclusion that potash has no special affinity for muscle, but is a protoplasmic poison, having an equal affinity for all protoplasm, and destroying the tissues in the order of their vital endowments.

Mr. Langley has made a number of observations upon the salivary glands, and finds that Nussbaum's supposition that the disappearance of the black colouration produced by osmic acid from the sub-maxillary (?) gland after treatment with glycerine is not due to the removal of ferment from the gland, but to some other cause, and that furthermore an amylolytic ferment does not exist at all in the sub-maxillary gland of the rabbit. He finds that there is a marked difference between the cat and the dog in regard to the salivary secretion, the sympathetic secreting nerves having a different connection with the gland cells in the two animals, a difference which favours the paralysing action of atropia in the cat.

The secretion of sweat is now known to be, like that of saliva, directly under the control of the nervous system, and to be excited by secreting nerves, independently of alterations in the vessels which supply secreting glands. Dr. Ott and Mr. Field show that the nerve centres in connection with the sweat glands can be stimulated by the poison muscarine, and that a greater amount of carbonic acid than usual in the circulating blood will also excite functional activity, a fact which would tend to explain the greater tendency to sweat which people observe when they are shut up in a close room, a tendency which appears to be greater than can be readily accounted for by the warmth of the room alone.

These brief observations will give some idea of the variety of physiological subjects discussed in the *Journal of Physiology*, and we heartily congratulate the able editor and his co-operators on the importance and interest of the results set before us in the numbers which have already appeared. We have no doubt that in such competent hands this journal will continue to maintain its high character, and, while absolutely indispensable to all who desire to follow the progress of physiology, it will, we think, do much to diffuse a knowledge of that science amongst general readers.

A UNIVERSAL GEOGRAPHY

Stanford's Compendium of Geography and Travel, based on Hellwald's "Die Erde und ihre Völker." Africa: Edited and extended by Keith Johnston. *Central and South America:* Edited and extended by H. W. Bates. With Ethnological Appendices by A. H. Keane, B.A. Maps and Illustrations. (London: Stanford, 1878.)

HELLWALD'S "Die Erde und ihre Völker" is well known in Germany, and has achieved a great popularity. We doubt, however, if a simple translation of Hellwald's work would have been either fair or wise; for though it is written more brilliantly than German works usually are, and although Hellwald himself is a competent geographer, it has several drawbacks which we should have regarded as serious defects had they been permitted to stand in this English edition. For one thing, Hellwald is a violent Anglophobist, and he takes every opportunity of depreciating English travellers or ignoring them altogether. We therefore think it wise in the publisher of the English edition to take the German work simply as a basis on which to found an English work that shall fairly represent the present state of geographical knowledge. The method adopted by the publisher appears to us well adapted to attain the end in view. He has succeeded in obtaining the services of geographers having a special knowledge of the various divisions of the earth of which the several sections of the work treat. These editors, taking the translation of Hellwald as their raw material, go over it, correcting and extending as far as they deem necessary in order to